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A COMPUTERIZED INTERACTIVE VOCABULARY DEVELOPMENT SYSTEM FOR ADVANCED LEARNERS

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The article begins with an analysis of the process of recording newly encountered vocabulary items in a typical language learning situation. It is argued that three aspects of this process can be significantly improved: the discovery and recording of meaning, subsequent retrieval of items for productive use and, thirdly, their retention in memory. A computerized system of vocabulary storage based on database management software is demonstrated to be an excellent means of implementing these improvements. The notion of vocabulary development at an advanced level is explored, leading to the conclusion that vocabulary learning can be a systematic and interactive process.

Interactive learning based on a computer system can be a small, yet significant realization of that ideal of learning whereby a student participates actively in the acquisition of knowledge by interacting or communicating with the source (traditionally the teacher), thus gaining an understanding of the subject and assuring it a place in long-term memory; he enriches it also with his own observations and experience, which are shared with fellow learners.

The principle of communicative learning has for some time now maintained its rightful place at the centre of foreign language pedagogy. It is recognized that while communication is taking place, some of the building blocks and construction rules of the language are assimilated. A vocabulary provides the essential building-blocks: words, with their derivatives, compounds and collocations. Though first encountered in context, in a learning situation items of vocabulary are usually isolated and explained, then recorded on paper for future reference. In parallel, and in process of time, they are committed to memory and eventually used by learners. A streamlined process—or is it?

THE PROCESS AND THE PROPOSAL

To discover the meaning of items of vocabulary, for instance in a written text, the learner may need to consult sources external to the text. In such an instance advanced learners, that is those who have sufficient knowledge and motivation to venture beyond the bilingual translation dictionary, benefit particularly from a search encompassing several reference works—monolingual, explanatory dictionaries, specialized glossaries, thesauri, dictionaries of synonyms, idioms, and so forth—each one offering new information. Time constraints coupled with an inadequate knowledge of dictionary types often mean that this type of

complex search does not take place. Although the search and discovery process should be individual, in principle the results could well be shared, with *interaction and exchange* between learners resulting in more complete information. Subsequent *productive use* could be improved by better retrieval methods. *Retention in memory* could be assisted, too: for instance by the possibility of meaningful regrouping of vocabulary items once they had been recorded. Recognizing these potential improvements, it is proposed to discuss in this paper the assertion that a computer-based system could be effective where manual techniques have proved inefficient.

Figure 1 traces the journey of a vocabulary item from its original context to a new context generated by the learner at some future date, by way of its temporary abode in the learner's cumulative vocabulary lists (the "WRITTEN RECORD"). The proposed objective is to improve two important stages in that process: (a) finding the meaning from reference works and (b) retrieving a word from the written record for productive use. Subsequently we explore the notion that the way in which the information is recorded, and hence the number of available retrieval options, can influence the chances of it being remembered.

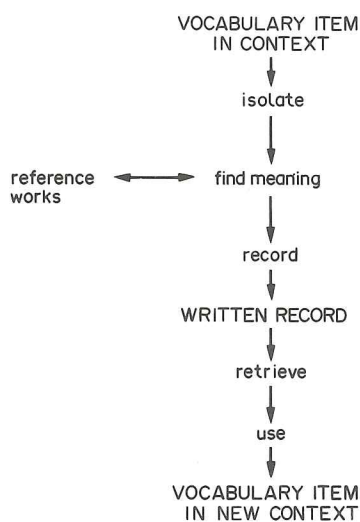


Fig. 1

SHARED INFORMATION

On encountering a large number of unknown words in a text, a (skilled) learner will generally focus on those items which are indispensable to the understanding of the main ideas. Typically, a single dictionary is used and others are consulted only if the first does not contain an entry for the item. A minimum of information is noted—definition or native language equivalent, perhaps a vital point of grammar—speedy comprehension of the text's message having been implicitly assigned priority. Given the constraints imposed by that priority, a desirable improvement in the quality and quantity of lexicographical data being noted by learners for each vocabulary item is only possible in a situation of cooperation, or labour-sharing, between learners in a group. In existing systems, where learners note

down details which they consider relevant, in their own individual style, on paper, an exchange of information is not feasible in practice. Assuming a different system which, by dint of its standard format, along with information merging and duplicating facilities, made the exchange of information possible, attention could be focussed on improving the quality of this information. To illustrate the benefits, an example: a typical "quick" search for an item (to crack down on), using one source, might yield:

crack down on sb/sth—take disciplinary action against
 e.g. crack down on gambling
 Hence, crack-down (noun)
 (*Oxford Advanced Learner's Dictionary of Current English*, 1974)

whereas a more thorough search, taking more time and involving the use of at least two more sources might give, in addition to the above:

crack down on (informal)—use one's authority (against), suppress, attack
 o: rebels, dissidents; minority; vice, crime; prostitution, gambling
 "The police are always being urged to crack down on drug addicts."
 "If the Inland Revenue officers had time they would crack down on tax evaders more quickly."
 (*Oxford Dictionary of Current Idiomatic English*, 1975)

crack down on (category: Social Volition)
 come down on, come down like a ton of bricks, stamp on,
 put a stop to, clamp down on
 (*Roget's Thesaurus*, 1982)

A learner's search for, say, five or six words, is likely to be more thorough than a search for twenty. If then, the task of dictionary consultation were divided amongst learners, more complete data concerning each item could be gathered, redundancy of research effort could be avoided, and the results stored on a system which allowed an exchange of information. A computer running suitably harnessed database management software can fulfill this role. The initial task of allocating vocabulary items to be researched by learners is one that the computer itself can handle by maintaining a transient file of items chosen by consecutive students, on a first come basis. The learner first checks to see if an item from the text is already in the database (i.e. it has been researched in the past) and, if not, the transient file for the current text is checked. If the item is not being researched by anyone else, the learner may "book" it for research. Once the consultation of various conventionally printed dictionaries has taken place, individual learners enter their information into the transient file (meanings, grammatical details, examples of usage and so on). Eventually, after all research has been completed, the learners receive a complete printout of the information relating to all the vocabulary items in the text. The transient file is then merged in with the database, which is being built up on a weekly basis into a valuable store of vocabulary knowledge. The record format would comprise the data fields presented in Fig. 2.

Vocabulary development is clearly not just a matter of adding to the stock of entries. At an advanced level, it is important to combat interference between languages, and for learners

ENTRY WORD
 DEFINITION
 NOTES, incl.
 idiom note
 usage note
 scope note
 grammatical note
 SYNONYMS
 ANTONYMS
 RELATED WORDS
 ABBREVIATIONS
 EXAMPLES IN CONTEXT
 SUBJECT FIELD
 MOTHER TONGUE EQUIVALENTS
 SOURCES, incl.
 source of entry word
 source of definition
 source of examples
 source of equivalents
 ORIGINATOR OF INPUT
 DATE OF INPUT

Fig. 2

to note the distinction between words which have similar meanings. It is equally important to know in what contexts a word is used, and to keep building up a good repertoire of words, synonyms and idioms for particular contexts or situations, which at this level will be centred on concepts (political, social, ethical) rather than practical situations ("at the airport", "at the theatre" etc.). Vocabulary development could well include the "production by learners of well-written definitions and context sentences for new vocabulary items" (Jones, 1986). In time, learners become aware of the processes of word formation and word association, and of stylistic values which operate in the language. This awareness is essential in selecting the right words for the right context. In addition, this heightened sensitivity and experience of the language should make it easier to remember new items of vocabulary. It is not difficult to see the potential benefits of a computerized system which allows the learner to selectively browse through a vocabulary collection according to criteria specified by him/her, and to produce selective printouts. It can be helpful in retrieving the appropriate vocabulary items for productive use, encourages an exploratory attitude towards language, and could well be instrumental in strengthening some of the associative links which enable words to establish themselves in memory. It is to these aspects of manipulation and retrieval that we now turn.

DIFFERENT PERSPECTIVES ON THE SAME DATA

While the learner is actively pursuing a series of searches for word meanings and recording them in written form, there is another activity taking place in parallel (Fig. 3.). This is the process of memorization, which takes place even when no conscious effort is made to commit information to memory. When such an effort is made, however, there are ways of improving the likelihood of memorization. A firmly established view is that "any learning technique or memory coding system must allow the language information to lose the episodic characteristics it has at first and be absorbed into the general system of semantic memory"

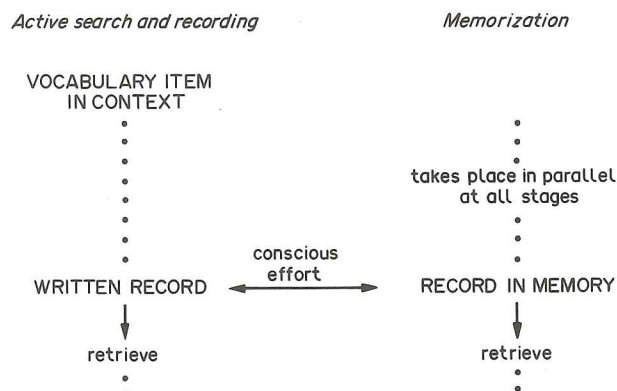


Fig. 3

(McDonough, 1981). Semantic categorization of words can be used to aid retention in memory, and indeed must be used to the full; but it is also worth while experimenting with alternative clustering criteria not based on proximity of meaning. Bowles and Poon (1985) have shown, for example, that orthographic priming can significantly facilitate word retrieval from memory. This suggests the possibility of using orthographic criteria to produce a number of limited vocabulary lists from a larger vocabulary store, and using these as an additional aid to the memorization and recall of the listed items.

Subsequent retrieval for productive use can take place either from an external store (the "WRITTEN RECORD")—which in our case would be a computer system—or directly from memory (the "RECORD IN MEMORY"). We are not concerned in this paper with details of retrieval from memory; we are, however, interested in improving retrieval from an external store, be it for productive use or for aiding the conscious effort of memorization.

The possibilities of selective retrieval from a computer database are well known. In this lexicographical application, the criteria applied can have an orthographic, syntactical, morphological, or semantic nature. Examples include: three-letter words beginning with "w"—wag, wan, wit, woe, wry; words beginning with "cy"—cyprian, cynic, cycle, cyclopic; words terminating in "iance"—defiance, alliance; hyphenated words—half-truth, class-conscious, life-blood; verbs prefixed with the pejorative "mis"—mishandle, mismanage, misrepresent or with the excessive "over"—overshadow, overgrow, overstrain.

The search does not have to be limited to the entry word. If, as in the record format in Fig. 2, a "subject field" is used containing the name of a subject, or broad semantic category, to which the vocabulary item is deemed to belong, a search performed on that field can yield specialized subject lists. For example, a request for entries containing "pollution" as the category or subject identifier might produce: contaminate, pollute, purify, waste, sewage, harmful, noxious . . . and many more.

It is not always possible to categorize words correctly and exhaustively at the time when they are first recorded. For that reason, the definition field can be searched, giving a list of words which are related in meaning through the fact that their definitions include a common concept.

Example: "work"

- "concerted refusal to work by employees" → strike
- "undertake work, responsibility" → to take on
- "one who employs servants, workmen, etc." → employer
- "payment made to person doing other than manual or mechanical work" → salary
- "remain specified time in working order" → to wear well
- "run at low speed without doing any work" → to idle
- "work up moist flour into dough" → to knead

(from *The Oxford Illustrated Dictionary*, 1984)

Any of the fields on the record can be searched in this way, resulting in pools of words associated on the basis of criteria specified by the learner, criteria which he/she considers meaningful and helpful. The boundaries of a text may now be crossed, in that a pool can be extracted from an accumulated store of words originating from many texts. This can be a way of revising and memorizing vocabulary encountered in the past, and a way of comparing and associating those "old" items with newly encountered ones. It means that new words, though originally tightly associated with a particular text and context, can gradually assume a more independent status. In so doing, they become available to the learner who can now take control of these lexical items and consciously forge new links to other, perhaps broader, contexts. Orthographic prompting can once again play an important role, this time as a means of finding, in the written store, items which cannot be recalled from memory, but where the learner has nevertheless retained some distinctive orthographic feature: the fact that the word begins with an "r" and ends in "tion", for instance.

It is time to say a few words about the software which might be used for the dictionary application being described here. To perform the kinds of search operations outlined above, fairly sophisticated database software needs to be used. A general-purpose database package like Ashton-Tate's dBASEIII, for instance, can serve the purpose admirably. The one drawback, however, might be that the software could prove to be rather difficult to use for those who have little previous experience of computers; in that case, there are at least three options. One is for the teacher to design suitable guiding screens, using dBASEIII's in-built programming language. Another solution would be to use a simpler package, such as Delta or Cardbox; and lastly, to opt initially for a simple program designed specifically for vocabulary storage, such as WORDSTORE by Christopher Jones. The latter program is easy to use and is certainly suitable for beginners; the trade-off is that its selective retrieval capabilities are very basic. The choice of options will inevitably be restricted by the hardware being used.

REFLECTING ON THE OUTCOME

Let us follow the vocabulary processing activities as presented in this paper to their outcome. Predictably, as more texts are studied, so the number of contexts and meanings for individual items increases. As has been noted, their various meanings must be explored thoroughly yet efficiently, preferably with the participation of a number of learners within a group. Their forms and meanings must be recorded, the information shared, the essence individually remembered. Anything which needs to be retrieved, for whatever reason, must

be accessible in an appropriate form, frequently offering a selection of lexical material, based on varied criteria, from which the user may choose. If we conclude that at the present time a system like a computer-centred database is uniquely able to meet these requirements, then the outcome of the application of the system may certainly be weighed up on the level of practical advantage (for instance experimentation before the purchase of a printed dictionary, a basis for testing etc.); but it may also be considered on the level of intellectual gains. Indeed, the very concept of "vocabulary development" would appear to hinge upon the idea of desirable growth, both in quantity and quality, ultimately leading to learners assuming autonomous control of their "treasury". It could also be reasonably linked to extending or developing vocabulary-related skills: referencing, association, deconstruction and reconstruction of the lexical items themselves—leading to a systematic build-up of a coherent framework of vocabulary knowledge, and a growing awareness that the memorization and retrieval of lexical items need not be a random, chance event.

The role of memory in language learning in general, and vocabulary expansion in particular, should not be underestimated. Memorization is partly an unconscious process; when it is deliberate, it is vital to ensure that a transition is made from conscious learning to "natural" production. This fact notwithstanding, some conscious, deliberate learning must take place, if only due to the time constraints normally imposed on the activity of language learning for a purpose.

The process of building up a vocabulary database will eventually result in a fully tailored dictionary, which could be subsequently used as a module in various computer-assisted learning programs. Fox (1986) notes the potential use of an on-line dictionary as part of the software for computer-assisted reading; it could also be usefully employed in a translation tutorial system, or as an accompaniment to word processing.

It must finally be stated that we are considering here a system which is sensitive to the needs of individual learners. Any good system should respect an individual's identity and be ready to accommodate his/her particular contribution. The system in question responds to the varying demands which learners will place upon it, depending on their capabilities. At times it may be constrained by the learners, or the learners may well be constrained by the system. In the latter case, a small auxiliary system can be maintained in a different form—perhaps as free notes on a word processor, where the information can be searched, modified, appended. The key to this type of system is the safeguarding of the individual's freedom within a clear framework, the outcome of which should be a spirit of initiative and active, interactive learning.

SOFTWARE

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